

## LUBRICATION PROCEDURE FOR VENTILATOR VALVE CASE ASSEMBLY MJV-2 SQUARE CLIPPARD VALVE

On NARKOMED Compact, Standard, and 2A machines with AV-E ventilators, the MJV-2 square Clippard valve is located on the valve case assembly inside the ventilator box (see Figure 1). Refer to Procedure 1.

On NARKOMED 2B, 3, and 4 machines, the MJV-2 square Clippard valve is located on the valve case assembly inside the bellows box (see Figure 1). Refer to Procedures 2 and 3.

It is recommended that the AV-E ventilator valve case assembly square Clippard valve be lubricated annually by an authorized Technical Service Representative. The correct lubricant for this procedure is "Lubrication Oil, P/N S010104.

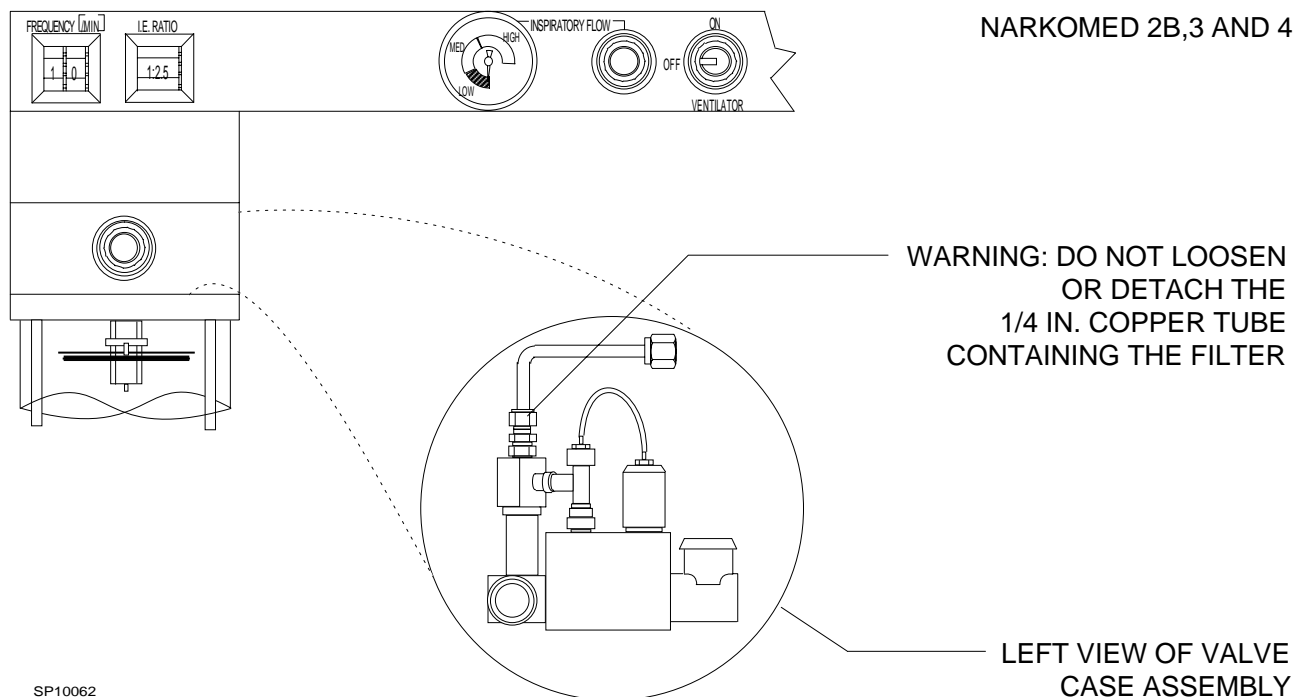
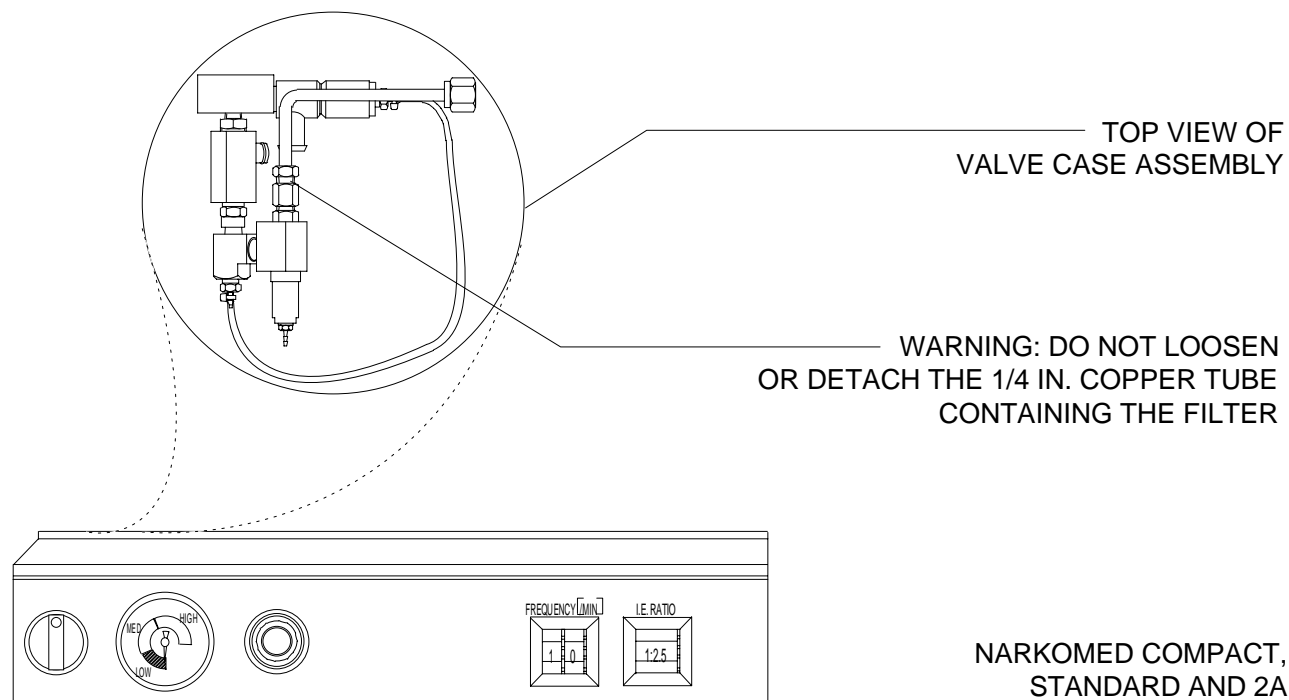
NOTE: At no time during the performance of the following procedures, shall the 1/4 in. copper tube containing the filter, be loosened or detached from the valve case assembly.

### LUBRICATION PROCEDURE 1

NOTE: Lubrication Procedure 1 applies to NARKOMED Compact, Standard, and 2A machines with AV-E ventilators.

1. Turn the VENTILATOR power switch to OFF.
2. Turn the SYSTEM POWER switch to OFF and unplug the system AC power cord (if applicable). Disable all circuit breakers.
3. Disconnect system pipeline hoses, turn off all reserve cylinders, and drain pneumatic pressure.
4. If the machine is equipped with a second shelf, remove the shelf and the mounting bracket (as an assembly) from the ventilator box.
5. If the machine is equipped with a panel mount assembly on top of the ventilator box, remove the screws securing the panel mount assembly to the ventilator. Rotate the panel mount assembly to expose the location of the valve case assembly and carefully place to one side.
6. If the machine is not equipped with a panel mount assembly, remove the screws securing the ventilator top shelf and remove the shelf to expose the location of the valve case assembly.

# **LUBRICATION PROCEDURE 1 (continued)**



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**Figure 2: VALVE CASE ASSEMBLY LOCATIONS**

# **LUBRICATION PROCEDURE 1 (continued)**

7. Remove the press-on clamp and small-diameter tubing attached to the miniature actuator.

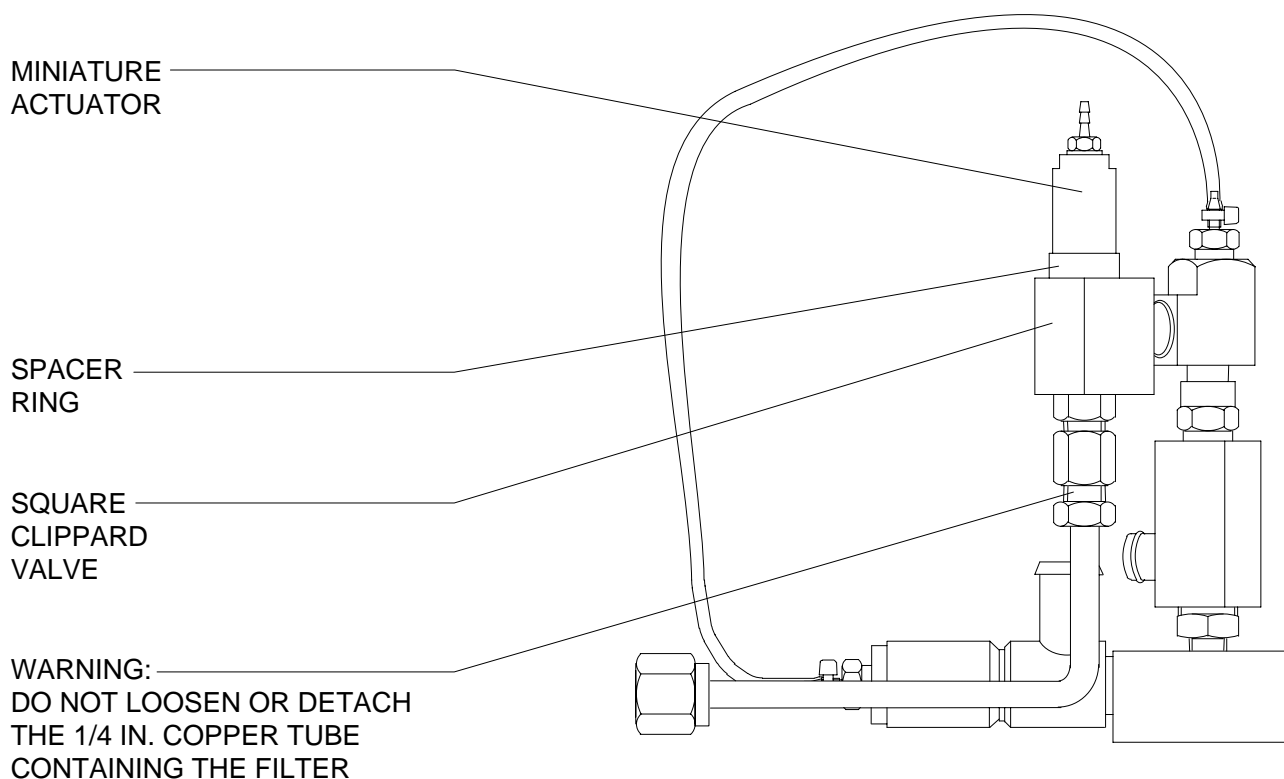
NOTE: Be careful not to misplace the spacer ring at the base of the miniature actuator.

8. Remove the miniature actuator from the square Clippard valve. See Figure 2.

NOTE: Clean the threads of the miniature actuator and the square Clippard valve to remove Loctite before lubrication and reassembly.

WARNING: Use only the lubricant specified in this service procedure. Do not substitute any other material.

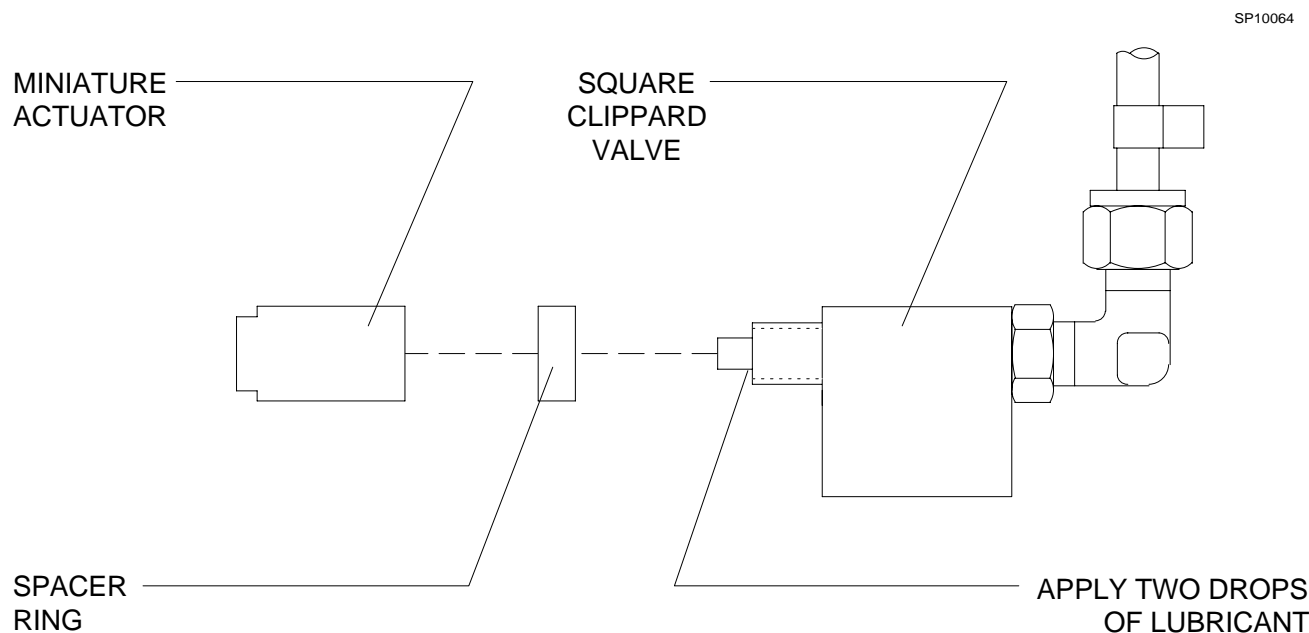
9. With the square Clippard valve shaft extended out, apply two (2) drops of lubricant to the base of the Clippard valve shaft (see Figure 3), and ensure that the lubricant is drawn into the valve body. Exercise in and out motion to ensure proper lubrication.



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**Figure 3: VALVE CASE ASSEMBLY - NM COMPACT, NM STD & NM 2A**

## LUBRICATION PROCEDURE 1 (continued)



**Figure 4: CLIPPARD VALVE LUBRICATION**

10. Reattach the miniature actuator to the square Clippard valve. Ensure that the spacer ring is in place as shown in Figure 2.
11. Reattach the small-diameter tubing to the miniature actuator and secure the connection with a press-on clamp.
12. If the machine is equipped with a panel mount assembly, reattach the panel mount assembly to the ventilator box and replace the screws that were previously removed.
13. If the machine is not equipped with a panel mount assembly, reattach the ventilator top shelf to the ventilator box and replace the screws that were previously removed.
14. Reattach the second shelf assembly if the machine is so equipped.
15. Reconnect system pipeline hoses, and plug the system AC power cord back in (if applicable).
16. Reset all circuit breakers.
17. Perform a complete PMS procedure on the machine.

## LUBRICATION PROCEDURE 2

NOTE: Lubrication Procedure 2 applies to NARKOMED 2B and 3 machines with a two-piece tidal volume adjustment and valve case assembly inside the bellows box.

1. Turn the VENTILATOR power switch to OFF.
2. Disconnect system pipeline hoses, turn off all reserve cylinders, and drain pneumatic pressure.
3. Unplug the system AC power cord and disable all circuit breakers.
4. Adjust the Tidal Volume knob to fully extend the bellows guide stop (minimum volume setting).
5. Remove the bellows hose and scavenger hose from the bellows assembly. Loosen the wing nuts to remove the bellows and bellows canister.
6. Remove the screws holding the bellows adjustment knob assembly and plate, and remove the plate.
7. On machines with a two-piece panel, remove the screws holding the black angle plate above the bellows adjustment knob assembly plate, and remove the black angle plate. Continue with step 17.
8. Some older machines have an unremovable panel above the bellows adjustment knob. If so, follow steps 9 through 16.
9. Remove all external data cables from the five-port serial interface assembly (if applicable).
10. Remove the screws securing the

utility shelf to the CRT/monitor housing assembly.

11. Remove the screws securing the hinged CRT/monitor housing assembly rear cover.
12. Remove the ground wire attached to the utility shelf.
13. Remove the utility shelf.
14. Remove screw located between the Trend-Mux PCB and data CRT which secures the CRT/monitor housing assembly to the center rib of the ventilator box (if applicable).
15. Remove the screws from the perimeter of the CRT/monitor housing assembly.

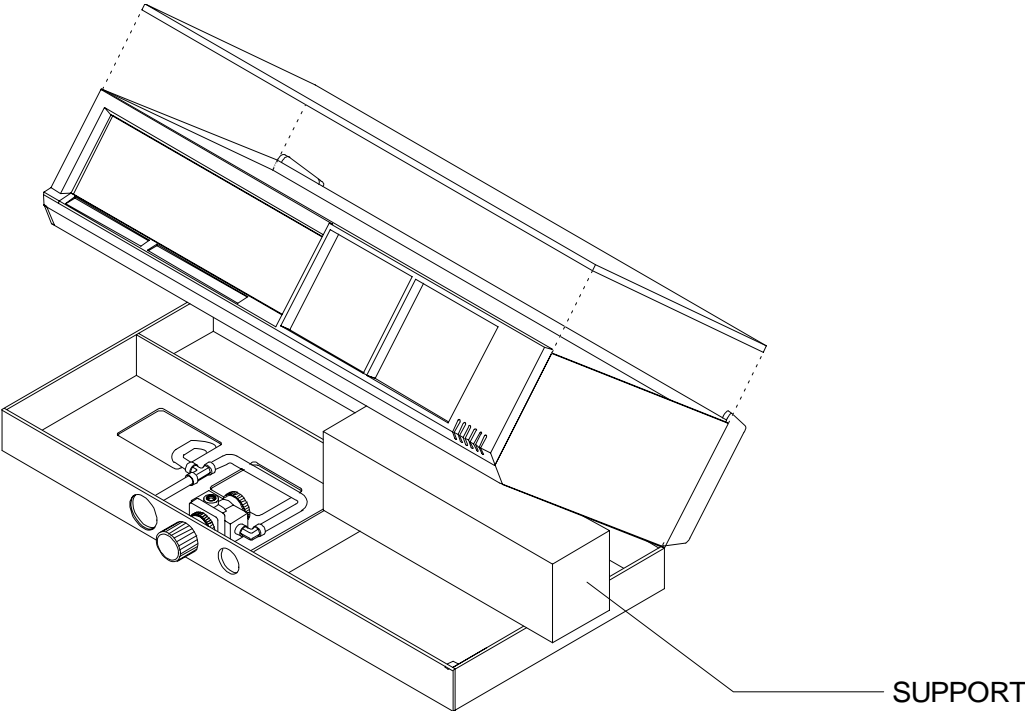
NOTE: Two people are required to perform the remaining portion of the procedure.

16. Prop up the front portion of the CRT/monitor housing assembly, and insert a 4"x4"x18" piece of wood, or similar support, between the center rib and right wall of ventilator box to support the CRT/monitor housing assembly. See Figure 4.
17. Remove the four screws securing the valve case assembly manifold to the bellows top plate. See Figure 5.
18. Remove the three screws securing the bellows top plate to the bellows box, and remove the plate to access the valve case assembly. See Figure 5.

NOTE: One screw is hidden behind bellows adjustment block.

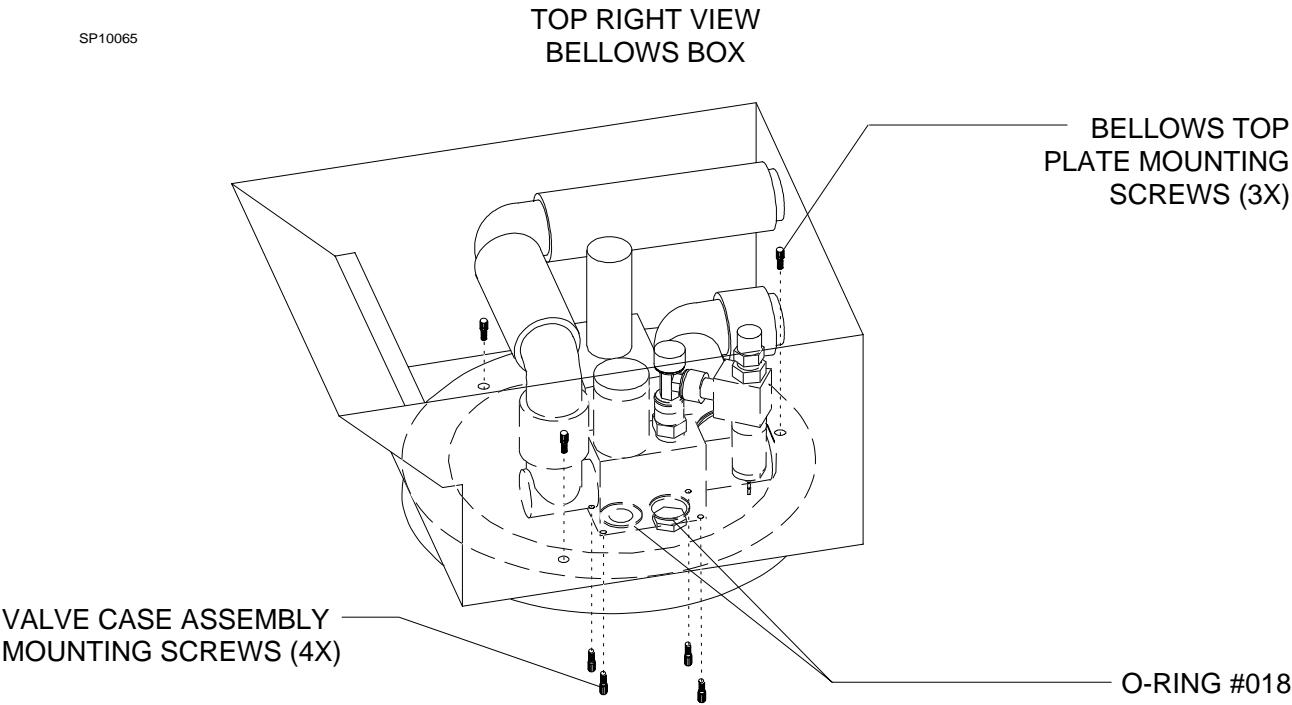
**LUBRICATION PROCEDURE 2 (continued)**

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**Figure 5: CRT/MONITOR HOUSING SUPPORT**

SP10065



**Figure 6: VALVE CASE ASSEMBLY**

## LUBRICATION PROCEDURE 2 (continued)

**NOTE:** Be careful not to misplace the two O-ring seals under the valve case assembly.

19. Remove the press-on clamp and small-diameter tubing attached to the miniature actuator.

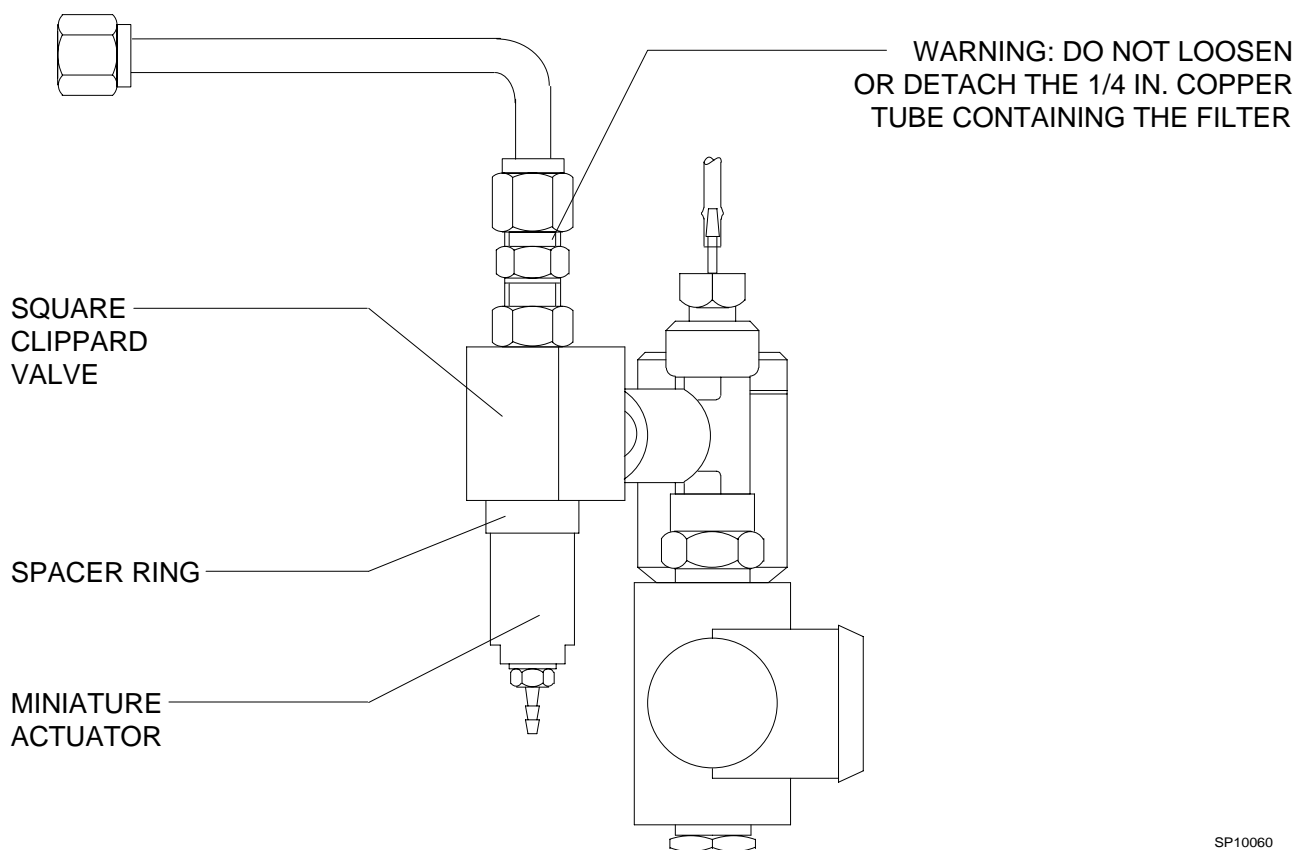
20. Remove the miniature actuator and spacer ring from the square Clippard valve. See Figure 6.

**NOTE:** Clean the threads of the miniature actuator and the square Clippard valve to remove Loctite before lubrication and reassembly.

**WARNING:** Use only the lubricant specified in this service procedure. Do not substitute any other material.

21. With the square Clippard valve shaft extended out, apply two (2) drops of lubricant to the base of the Clippard valve shaft (see Figure 3), and ensure that the lubricant is drawn into the valve body. Exercise in and out motion to ensure proper lubrication.

22. Reattach the miniature actuator to the square Clippard valve. Ensure that the spacer ring is in place as shown in Figure 6.



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Figure 7: VALVE CASE ASSEMBLY - NM 2B, NM 3 & NM 4, REAR VIEW

<b>LUBRICATION PROCEDURE 2 (continued)</b>
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| <p>23. Reattach the small-diameter tubing to the miniature actuator, and secure the connection with a press-on clamp.</p> <p>24. Inspect the two O-rings from the bottom of the valve case assembly for any damage, and replace them if necessary. Ensure that the O-rings are secured in the recesses on the bottom of the valve case assembly.</p> <p>25. Reattach the valve case assembly to the bellows top plate using the four screws that were previously removed.</p> <p>26. Reattach the bellows top plate to the bellows box using the three screws that were previously removed.</p> <p>27. If on a machine with a two-piece panel, reattach the black angle plate and replace the screws which were previously removed. Continue with step 36.</p> <p>28. If on an earlier machine with an unremovable panel above the bellows adjustment knob, follow steps 29 through 35.</p> <p>29. Remove the prop supporting the CRT/monitor housing assembly. Ensure that the data cables and wire harnesses are not pinched as the CRT/monitor housing assembly is lowered into place.</p> <p>30. Reinstall the screws around the perimeter of the CRT/monitor housing assembly.</p> | <p>31. Reinstall the screw between the Trend-Mux PCB and the data CRT (if applicable).</p> <p>32. Position the utility shelf on the CRT/monitor housing assembly, and reattach the ground wire.</p> <p>33. Reattach the utility shelf to the CRT/monitor housing assembly using the screws that were previously removed.</p> <p>34. Reinstall the screws that secure the hinged CRT/monitor housing assembly rear cover.</p> <p>35. Reattach all external data cables previously removed from the five-port serial interface assembly (if applicable).</p> <p>36. Reattach the bellows adjustment knob assembly and plate and replace the screws that were previously removed. Ensure that the roll pin in the bellows adjustment shaft properly engages the slots in the adjustment knob assembly.</p> <p>37. Reinstall the bellows canister and bottom plate assembly, and reattach the bellows and scavenger hoses.</p> <p>38. Reconnect system pipeline hoses, and plug the system AC power cord back in.</p> <p>39. Reset all circuit breakers.</p> <p>40. Perform a complete PMS procedure on the unit.</p> |
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### LUBRICATION PROCEDURE 3

NOTE: Lubrication Procedure 3 applies to NARKOMED 2B, 3 and 4 machines with a one-piece tidal volume adjustment and valve case assembly inside the bellows box.

1. Turn the VENTILATOR power switch to OFF.
2. Disconnect system pipeline hoses, turn off all reserve cylinders, and drain pneumatic pressure.
3. Unplug the system AC power cord and disable all circuit breakers.
4. Adjust the Tidal Volume knob to fully extend the bellows guide stop (minimum volume setting).
5. Remove the bellows hose and scavenger hose from the bellows assembly. Loosen the wing nuts to remove the bellows and bellows canister.
6. Remove the screws holding the bellows adjustment knob assembly and plate, and remove the plate.
7. Remove the screws from the perimeter of the CRT/monitor housing assembly.

NOTE: Two people are required to perform the remaining portion of the procedure.

8. Prop up the front portion of the CRT/monitor housing assembly, and insert a 4"x4"x18" piece of wood, or similar support, between the center rib and right wall of ventilator box to support the CRT/monitor housing assembly. See Figure 4.
9. Remove the bellows guide by

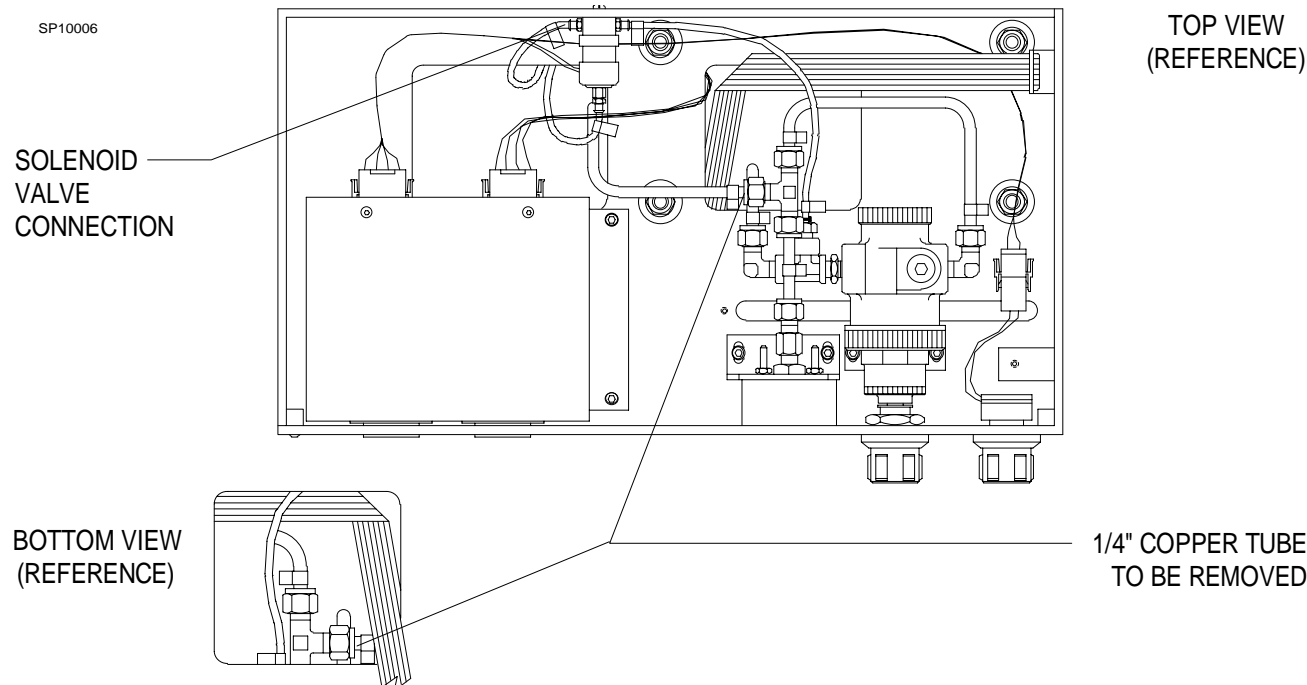
unscrewing its stem from the bellows adjustment rod.

10. Remove the volume indicator from the bellows adjustment rod by loosening its two set screws. Note the position of the indicator so that it can be reassembled in the same manner.
11. Remove the screws securing the muffler access panel at the rear of the bellows box and remove the panel.
12. Remove the muffler/silencer (white tube) from intake flange at the interface wall by turning counterclockwise.
13. Disconnect the press-on clamp and small-diameter tubing from the left-side hose barb on the solenoid valve (port labeled OUT). See Figure 7.
14. Disconnect and remove the 1/4 in. copper tube at the tee fitting located upstream from the Clippard valve and filter. See Figure 7.

NOTE: At no time during the performance of these procedures, shall the 1/4 in. copper tube containing the filter, be loosened or detached from the valve case assembly.

15. Unscrew the tidal volume adjustment rod housing tube from the block. Be careful not to misplace the spacer ring.

# **LUBRICATION PROCEDURE 3 (continued)**



**Figure 8: VENTILATOR BOX**

16. Pull the bellows adjustment rod and guide up to remove it from the block body.

17. Remove the two screws securing the valve case and tidal volume adjustment assembly to the bellows top plate. See Figure 8.

NOTE: Be careful not to misplace the two O-ring seals and spacer ring under the valve case assembly.

18. Pull both large-diameter tubes forward until they clear the muffler housing interface wall.

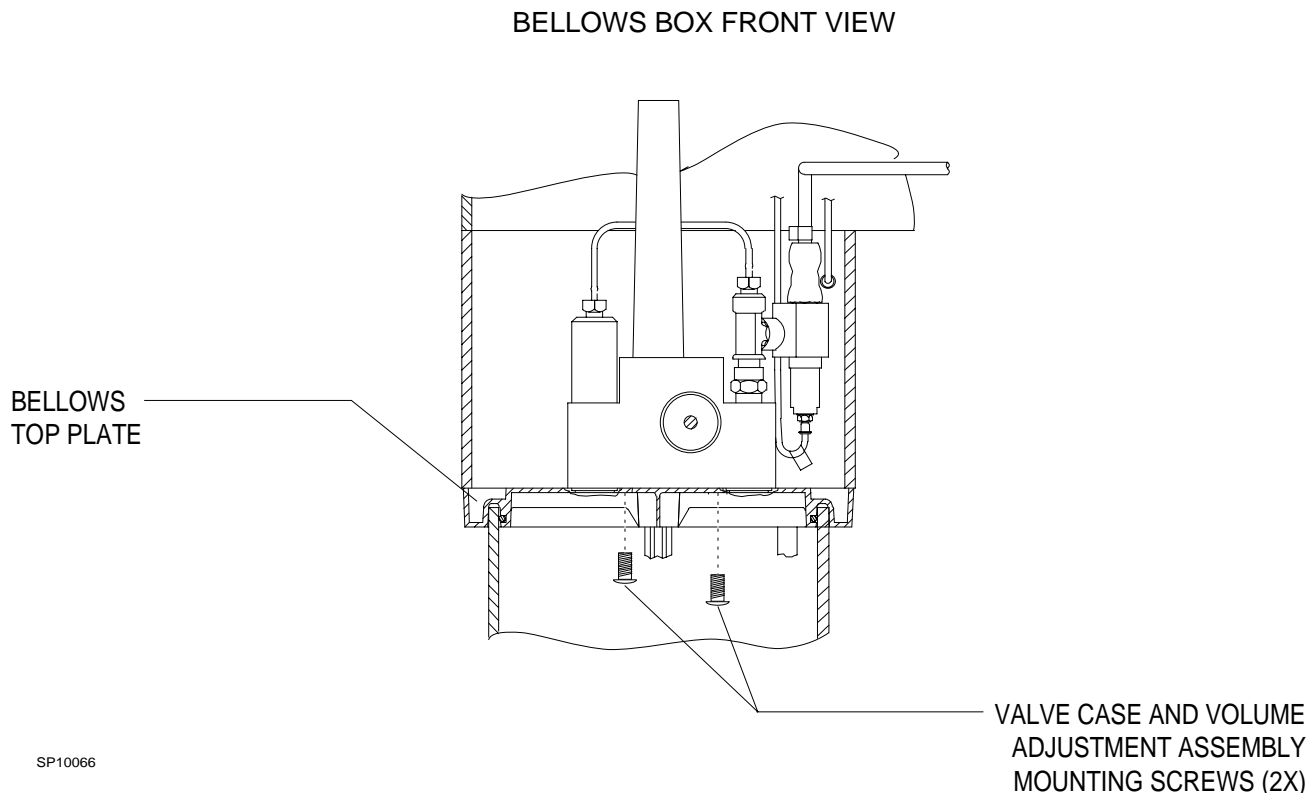
19. Rotate the valve case and tidal volume adjustment assembly 45 degrees counterclockwise.

20. Fold both large-diameter tubes in toward the body of the valve case and tidal volume adjustment assembly, or remove the spring retaining clamps and hoses from the valve body (note the arrangement of hoses for reassembly).

21. Slide the valve case and tidal volume adjustment assembly body out the front of the bellows box. Be careful not to damage the nylon hose barbs on the pilot actuator and brass fitting.

22. Remove the miniature actuator and spacer ring from the square Clippard valve. See Figure 6.

**LUBRICATION PROCEDURE 3 (continued)**



**Figure 9: VALVE CASE & TIDAL VOLUME ADJUSTMENT ASSEMBLY**

**NOTE:** Clean threads of miniature actuator and square Clippard valve to remove Loctite before lubrication and reassembly.

**WARNING:** Use only the lubricant specified in this service procedure. Do not substitute any other material.

23. With the square Clippard valve shaft extended out, apply two (2) drops of lubricant to the base of the Clippard valve shaft (see Figure 3), and ensure that the lubricant is drawn into the valve body. Exercise in and out motion to ensure proper lubrication.

24. Reattach the miniature actuator to

the square Clippard valve. Ensure that the spacer ring is in place as shown in Figure 6.

25. Inspect the O-rings at the bellows top plate for any damage, and replace them if necessary. Ensure that the O-rings are correctly recessed into the grooves in the top plate.

26. Reinstall the valve case and tidal volume adjustment assembly back into the bellows box.

<b>LUBRICATION PROCEDURE 3 (continued)</b>
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| <p>27. Reattach the large-diameter tubes and spring retaining clamps to the valve case and tidal volume adjustment assembly, if previously removed.</p> <p>28. Connect open ends of large-diameter tubes to opening at the muffler housing interface wall.</p> <p>29. Slide the spacer ring into the recess on the bottom of the valve case and tidal volume adjustment assembly, and secure the assembly to the bellows top plate using the two screws that were previously removed.</p> <p>30. Attach the 1/4 in. copper tube to the tee fitting in the ventilator box.</p> <p>31. Insert the spacer ring and bellows adjustment rod and guide into block body.</p> <p>32. Reattach the rod housing tube onto the block body.</p> <p>33. Attach small-diameter tubing from the miniature actuator to the left-side hose barb on the solenoid valve (port labeled OUT), and secure the connection with a press-on clamp.</p> <p>NOTE: After the connection is made, ensure that there are no kinks or sharp bends in the tubing.</p> <p>34. Reattach the muffler/silencer to intake flange at the muffler housing interface, and reattach the access panel using the screws which were previously removed.</p> | <p>35. Install the volume indicator on the bellows adjustment rod in the same position as before disassembly, and tighten its two set screws.</p> <p>36. Install the bellows guide by screwing its stem into the bellows adjustment rod, and secure it with #222 (purple) Loctite.</p> <p>37. Remove the prop supporting the CRT/monitor housing assembly. Ensure that the data cables and wire harnesses are not pinched as the CRT/monitor housing assembly is lowered into place.</p> <p>38. Reinstall the screws around the perimeter of the CRT/monitor housing assembly.</p> <p>39. Reattach the bellows adjustment knob assembly and plate, and replace the screws that were previously removed. Ensure that the roll pin in the bellows adjustment shaft properly engages the slots in the adjustment knob assembly.</p> <p>40. Reinstall the bellows canister and bottom plate assembly, and reattach the bellows and scavenger hoses.</p> <p>41. Reconnect system pipeline hoses, and plug the system AC power cord back in.</p> <p>42. Reset all circuit breakers.</p> <p>43. Perform a complete PMS procedure on the unit.</p> |
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